

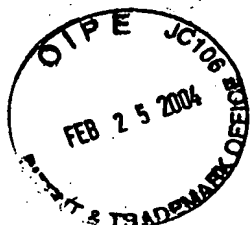
ATTACHMENTS:

- 2) Computer readable copy of corrected Sequence Listing**



ATTACHMENTS:

Mark-up of Sequence Listing as originally filed



SEQUENCE LISTING

VERSION
SHOWING
CORRECTIONS

<110> Sumitomo Chemical Co., Ltd

<120> PROCESS FOR PRODUCING OPTICALLY ACTIVE 4-HALO-3-HYDROXYBUTANOATE

<130>

<140>

<141>

<160> 27

<170> PatentIn Ver. 2.1

<210> 1

<211> 325

<212> PRT

<213> Penicillium citrinum

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20 25 30

Tyr Thr Ala Val Thr Thr Ala Leu Lys Thr Gly Tyr Arg His Leu Asp
35 40 45

Cys Ala Trp Tyr Tyr Leu Asn Glu Gly Glu Val Gly Glu Gly Ile Arg
50 55 60

Asp Phe Leu Lys Glu Asn Pro Ser Val Lys Arg Glu Asp Ile Phe Val
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Cys Thr Lys Val Trp Asn His Leu His Arg Tyr Glu Asp Val Leu Trp
85 90 95

Lys Asn Leu Ser Ala
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<222> (1).. (978)

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20 25 30

25 tat act gct gtc acc act ggc ctg aag acc ggt tac cgt cac ttg gac 144
Tyr Thr Ala Val Thr Thr Ala Leu Lys Thr Gly Tyr Arg His Leu Asp
35 40 45

30 tgt gcc tgg tac tac ctg aac gag ggt gag gtt ggt gag ggt atc cgt 192
Cys Ala Trp Tyr Tyr Leu Asn Glu Gly Glu Val Gly Glu Gly Ile Arg
50 55 60

gac ttc ctg aag gag aac ccc tog gtg aag cgt gag gac atc ttc gtc 240
Asp Phe Leu Lys Glu Asn Pro Ser Val Lys Arg Glu Asp Ile Phe Val
65 70 75 80

35 tgc acc aag gtg tgg aac cac ctc cac cgt tat gag gac gtc ctc tgg 288
Cys Thr Lys Val Trp Asn His Leu His Arg Tyr Glu Asp Val Leu Trp
85 90 95

40 tcc att gac gac tcc ctg aag cgt ctt gga ctt gac tac gtt gat atg 336
Ser Ile Asp Asp Ser Leu Lys Arg Leu Gly Leu Asp Tyr Val Asp Met
100 105 110

Ser Ile Asp Asp Ser Leu Lys Arg Leu Gly Leu Asp Tyr Val Asp Met
100 105 110

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115 120 125

Pro Lys Ile Gly Pro Asp Gly Lys Tyr Val Ile Leu Lys Asp Leu Thr
130 135 140

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145 150 155 160

Arg Lys Ala Arg Ser Ile Gly Val Ser Asn Trp Thr Ile Ala Asp Leu
165 170 175

15 Glu Lys Met Ser Lys Phe Ala Lys Val Met Pro His Ala Asn Gln Ile
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20 195 200 205

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210 215 220

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225 230 235 240

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245 250 255

30 Trp Gly Leu Arg Arg Gly Tyr Val Val Leu Pro Lys Ser Ser Asn Pro
260 265 270

Lys Arg Ile Glu Ser Asn Phe Lys Ser Ile Glu Leu Ser Asp Ala Asp
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Phe Glu Ala Ile Asn Ala Val Ala Lys Gly Arg His Phe Arg Phe Val
290 295 300

40 Asn Met Lys Asp Thr Phe Gly Tyr Asp Val Trp Pro Glu Glu Thr Ala
305 310 315 320

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	245 250 255	
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Lys

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<210> 6

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<212> PRT

<213> *Penicillium citrinum*

15

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<211> 14

<212> PRT

<213> *Penicillium citrinum*

25

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<211> 20

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<220>

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oligonucleotide primer for PCR

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10

<210> 13

<211> 20

<212> DNA

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<400> 13

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20

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20

35

<210> 15

<211> 697

<212> DNA

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<213> Escherichia coli

<400> 15

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   ggcttttgta ccttcgctag tgaaggttcc aagggcgaga cctatactgc tgtcaccact 180
   gccctgaaga ccggttaccg tcacttggac tgtgcctggc actacctgaa cgaggggtgag 240
   gttgggtgagg gtatccgtga cttcctgaag gagaaccctc oggtgaagcg tgaggacatc 300
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15 <212> DNA

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25  tttoggatat gatgtotggc ccgaggagac cgocaagaac ctgtctgcgt gaatotctac 420
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<211> 417

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<213> Escherichia coli

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15

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<213> Artificial Sequence

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 Thr Gly Leu Gly Lys Ala Met Ala Ile Arg Phe Ala Thr Glu Lys Ala
 20 25 30

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 Lys Val Val Val Asn Tyr Arg Ser Lys Glu Glu Glu Ala Asn Ser Val
 35 40 45

25 tta gaa gaa att aaa aaa gtg ggc gga gag gct att gcc gtc aaa ggt 192
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 Ile Asp Thr Asn Leu Thr Gly Ala Phe Leu Gly Ser Arg Glu Ala Ile
 115 120 125

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10	agt aaa ggc gga atg aag ctc atg acc gaa aca ctt gca tta gaa tac	528
	Ser Lys Gly Gly Met Lys Leu Met Thr Glu Thr Leu Ala Leu Glu Tyr	
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	180 185 190	
20	aca ccg att aac gct gag aaa ttt gct gat cct gag cag cgt gca gat	624
	Thr Pro Ile Asn Ala Glu Lys Phe Ala Asp Pro Glu Gln Arg Ala Asp	
	195 200 205	
25	gta gaa ago atg att cca atg gga tac att gga gag ccg gaa gaa att	672
	Val Glu Ser Met Ile Pro Met Gly Tyr Ile Gly Glu Pro Glu Glu Ile	
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 50 55 60

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 85 90 95

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 115 120 125

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 130 135 140

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	Glu Lys Met Ser Lys Phe Ala Lys Val Met Pro His Ala Asn Gln Ile	
	180 185 190	
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	Glu Ile His Pro Phe Leu Pro Asn Glu Glu Leu Val Gln Tyr Cys Phe	
	195 200 205	
20	tcc aag aac att atg ccc gtg gcc tac tct cct ctg ggc tcg cag aac	672
	Ser Lys Asn Ile Met Pro Val Ala Tyr Ser Pro Leu Gly Ser Gln Asn	
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	Gln Val Pro Thr Thr Gly Glu Arg Val Ser Glu Asn Lys Thr Leu Asn	
	225 230 235 240	
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	Glu Ile Ala Glu Lys Gly Gly Asn Thr Leu Ala Gln Val Leu Ile Ala	
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	Trp Gly Leu Arg Arg Gly Tyr Val Val Leu Pro Lys Ser Ser Asn Pro	
	260 265 270	
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	Lys Arg Ile Glu Ser Asn Phe Lys Ser Ile Glu Leu Ser Asp Ala Asp	
	275 280 285	
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 20 25 30

35 tat act gct gtc acc act gcc ctg aag acc ggt tac ogt cac ttg gac 144
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 35 40 45

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 50 55 60

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	Cys Thr Lys Val Trp Asn His Leu His Arg Tyr Glu Asp Val Leu Trp	
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	Ser Ile Asp Asp Ser Leu Lys Arg Leu Gly Leu Asp Tyr Val Asp Met	
	100 105 110	
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	Phe Leu Val His Trp Pro Ile Ala Ala Glu Lys Asn Gly Gln Gly Glu	
	115 120 125	
20	ccc aag att gcc cct gac gcc aaa tac gtc att ctc aag gac ctg acc	432
	Pro Lys Ile Gly Pro Asp Gly Lys Tyr Val Ile Leu Lys Asp Leu Thr	
	130 135 140	
25	gag aac ccc gag ccc aca tgg cgc got atg gag aag att tat gag gat	480
	Glu Asn Pro Glu Pro Thr Trp Arg Ala Met Glu Lys Ile Tyr Glu Asp	
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	Arg Lys Ala Arg Ser Ile Gly Val Ser Asn Trp Thr Ile Ala Asp Leu	
	165 170 175	
35	gag aag atg tcc aag ttc gcc aag gtc atg cct cac gcc aac cag atc	576
	Glu Lys Met Ser Lys Phe Ala Lys Val Met Pro His Ala Asn Gln Ile	
	180 185 190	
40	gag att cac ccc ttc ctg ccc aac gag gag ctg gtg cag tac tgc ttc	624
	Glu Ile His Pro Phe Leu Pro Asn Glu Glu Leu Val Gln Tyr Cys Phe	
	195 200 205	
45	tcc aag aac att atg ccc gtg gcc tac tct cct ctg gcc tgc cag aac	672
	Ser Lys Asn Ile Met Pro Val Ala Tyr Ser Pro Leu Gly Ser Gln Asn	
	210 215 220	
50	cag gtt ccc acc acc ggt gag cgg gtc agc gag aac aag act ctg aac	720

	Gln Val Pro Thr Thr Gly Glu Arg Val Ser Glu Asn Lys Thr Leu Asn	
	225 230 235 240	
5	gag atc gcc gag aag ggc ggc aac acc ctt gct cag gtt ctt att gcc Glu Ile Ala Glu Lys Gly Gly Asn Thr Leu Ala Gln Val Leu Ile Ala	768
	245 250 255	
10	tgg ggt ctg cgc cgt ggc tac gtc gtt ctc ccc aag agc tcc aac ccc Trp Gly Leu Arg Arg Gly Tyr Val Val Leu Pro Lys Ser Ser Asn Pro	816
	260 265 270	
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	275 280 285	
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	290 295 300	
25	aac atg aag gat act ttc gga tat gat gtc tgg occ gag gag acc gcc Asn Met Lys Asp Thr Phe Gly Tyr Asp Val Trp Pro Glu Glu Thr Ala	960
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Glu Ile Pro Lys Pro Glu Pro Gly Pro Gly Glu Val Leu Leu Glu Val

20

25

30

35 Thr Ala Ala Gly Val Cys His Ser Asp Asp Phe Ile Met Ser Leu Pro

35

40

45

Glu Glu Gln Tyr Thr Tyr Gly Leu Pro Leu Thr Leu Gly His Glu Gly

50

55

60

Ala Gly Lys Val Ala Ala Val Gly Glu Gly Val Glu Gly Leu Asp Ile
65 70 75 80

5 Gly Thr Asn Val Val Val Tyr Gly Pro Trp Gly Cys Gly Asn Cys Trp
85 90 95

His Cys Ser Gln Gly Leu Glu Asn Tyr Cys Ser Arg Ala Gln Glu Leu
100 105 110

10 Gly Ile Asn Pro Pro Gly Leu Gly Ala Pro Gly Ala Leu Ala Glu Phe
115 120 125

Met Ile Val Asp Ser Pro Arg His Leu Val Pro Ile Gly Asp Leu Asp
15 130 135 140

Pro Val Lys Thr Val Pro Leu Thr Asp Ala Gly Leu Thr Pro Tyr His
145 150 155 160

20 Ala Ile Lys Arg Ser Leu Pro Lys Leu Arg Gly Gly Ser Tyr Ala Val
165 170 175

Val Ile Gly Thr Gly Gly Leu Gly His Val Ala Ile Gln Leu Leu Arg
180 185 190

25 His Leu Ser Ala Ala Thr Val Ile Ala Leu Asp Val Ser Ala Asp Lys
195 200 205

Leu Glu Leu Ala Thr Lys Val Gly Ala His Glu Val Val Leu Ser Asp
30 210 215 220

Lys Asp Ala Ala Glu Asn Val Arg Lys Ile Thr Gly Ser Gln Gly Ala
225 230 235 240

35 Ala Leu Val Leu Asp Phe Val Gly Tyr Gln Pro Thr Ile Asp Thr Ala
245 250 255

Met Ala Val Ala Gly Val Gly Ser Asp Val Thr Ile Val Gly Ile Gly
260 265 270

40 Asp Gly Gln Ala His Ala Lys Val Gly Phe Phe Gln Ser Pro Tyr Glu
275 280 285

Ala Ser Val Thr Val Pro Tyr Trp Gly Ala Arg Asn Glu Leu Ile Glu
290 295 300

5 Leu Ile Asp Leu Ala His Ala Gly Ile Phe Asp Ile ^{Ser Val Glu Thr} Gly Gly Gly Asp
305 310 315 320

^{Phe Ser Leu Asp Asn Gly Ala Glu Ala Tyr Arg Arg Leu Ala Ala Gly}
~~Leu Gln Ser Arg Gln Arg Cys Arg Ser Val Ser Thr Thr Gly Cys Arg~~
325 330 335

10 ^{Thr Leu Ser Gly Arg Ala Val Val Val Pro Gly Leu}
~~Asn Ala Gln Arg Pro Cys Gly Cys Gly Pro Trp Ser Val Val Pro Thr~~
340 345 350

15 ~~Ala Val Glu Arg Gln Arg Lys Asn Thr Asp Ala Arg Pro Asn Ser Ile~~
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20 Arg
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Glu Ile Pro Lys Pro Glu Pro Gly Pro Gly Glu Val Leu Leu Glu Val
40 20 25 30

acc gct gct ggc gtc tgc cac tcg gac gac ttc atc atg ago ctg ccc 144

	Thr	Ala	Ala	Gly	Val	Cys	His	Ser	Asp	Asp	Phe	Ile	Met	Ser	Leu	Pro	
	35						40						45				
5	gaa gag cag tac acc tac ggc ctt ccg ctc acg ctc ggc cac gaa ggc																192
	Glu Glu Gln Tyr Thr Tyr Gly Leu Pro Leu Thr Leu Gly His Glu Gly																
	50			55			60										
10	gca ggc aag gtc gcc gcc gtc ggc gag ggt gtc gaa ggt ctc gac atc																240
	Ala Gly Lys Val Ala Ala Val Gly Glu Gly Val Glu Gly Leu Asp Ile																
	65			70			75			80							
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	Gly Thr Asn Val Val Val Tyr Gly Pro Trp Gly Cys Gly Asn Cys Trp																
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	His Cys Ser Gln Gly Leu Glu Asn Tyr Cys Ser Arg Ala Gln Glu Leu																
	100						105						110				
20	gga atc aat cct ccc ggt ctc ggt gca ccc ggc gcg ttg gcc gag ttc																384
	Gly Ile Asn Pro Pro Gly Leu Gly Ala Pro Gly Ala Leu Ala Glu Phe																
	115			120			125										
25	atg atc gtc gat tct cct cgc cac ctt gtc ccg atc ggt gac ctc gac																432
	Met Ile Val Asp Ser Pro Arg His Leu Val Pro Ile Gly Asp Leu Asp																
	130			135			140										
30	ccg gtc aag acg gtg ccg ctg acc gac gcc ggt ctg acg ccg tat cac																480
	Pro Val Lys Thr Val Pro Leu Thr Asp Ala Gly Leu Thr Pro Tyr His																
	145			150			155			160							
35	gcg atc aag cgt tct ctg ccg aaa ctt cgc gga ggc tcg tac gcg gtt																528
	Ala Ile Lys Arg Ser Leu Pro Lys Leu Arg Gly Gly Ser Tyr Ala Val																
				165			170						175				
	gtc att ggt acc ggc ggt ctc ggc cac gtc got att cag ctc ctc cgc																576
	Val Ile Gly Thr Gly Gly Leu Gly His Val Ala Ile Gln Leu Leu Arg																
	180			185			190										
40	cac ctc tcg gcg gca acg gtc atc got ttg gac gtg agc gcg gac aag																624
	His Leu Ser Ala Ala Thr Val Ile Ala Leu Asp Val Ser Ala Asp Lys																
	195			200			205										

5

40

24

~~Arg Pro Gly Ile Ser Val Arg Asn Ser Val Cys Ala Ser Cys Thr Pro~~
370 375 380

~~cga tga~~

1158

5 ~~Arg~~
385